

No.

200400286



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Virginia Tech Intellectual Properties, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSE, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. IN THE UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMERICAL GENERATIONS SPECIFIED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

WHEAT, COMMON

'Renwood 3260'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this twenty-fourth day of March, in the year two thousand and five.

Attest:

Al M. Zeller
Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Mill Johnson
Secretary of Agriculture

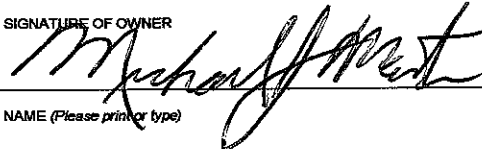


U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE
(Instructions and information collection burden statement on reverse)

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2428).

1. NAME OF OWNER Virginia Tech Intellectual Properties, Inc.		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME VA96-54-326		3. VARIETY NAME RENWOOD 3260	
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP Code, and Country) Virginia Tech Intellectual Properties, Inc. 1872 Pratt Dr., Ste.1625 Blacksburg, VA 24060		5. TELEPHONE (include area code) 540-951-9378		FOR OFFICIAL USE ONLY PVPO NUMBER 200400286 FILING DATE August 2, 2004	
		6. FAX (include area code) 540-951-5292			
7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION (corporation, partnership, association, etc.) Corporation		8. IF INCORPORATED, GIVE STATE OF INCORPORATION Virginia		9. DATE OF INCORPORATION June 20, 1985	
10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION. (First person listed will receive all papers) Carl A. Griffey Crop and Soil Environmental Sciences Virginia Tech Blacksburg, VA 24061-0404				FILING AND EXAMINATION FEES: \$ ① \$ 2705.00 \$ ② 947.00 ① 8/2/2004 DATE 8/16/2004 CERTIFICATION FEE: \$ 432.00 DATE 10/15/2004	
11. TELEPHONE (include area code) 540-231-9789		12. FAX (include area code) 540-231-3431		13. E-MAIL Cgriffey@vt.edu	
14. CROP KIND (Common Name) Wheat, Common		15. GENUS AND SPECIES NAME OF CROP <i>Triticum aestivum</i>			
16. FAMILY NAME (Botanical) Triticeae		17. IS THE VARIETY A FIRST GENERATION HYBRID? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			
18. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse) a. <input checked="" type="checkbox"/> Exhibit A. Origin and Breeding History of the Variety b. <input checked="" type="checkbox"/> Exhibit B. Statement of Distinctness c. <input checked="" type="checkbox"/> Exhibit C. Objective Description of Variety d. <input checked="" type="checkbox"/> Exhibit D. Additional Description of the Variety (Optional) e. <input checked="" type="checkbox"/> Exhibit E. Statement of the Basis of the Owner's Ownership f. <input checked="" type="checkbox"/> Voucher Sample (2,500 viable untreated seeds or, for tuber propagated varieties, verification that tissue culture will be deposited and maintained in an approved public repository) g. <input checked="" type="checkbox"/> Filing and Examination Fee (\$2,705), made payable to "Treasurer of the United States" (Mail to the Plant Variety Protection Office)		19. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD AS A CLASS OF CERTIFIED SEED? See Section 83(a) of the Plant Variety Protection Act <input checked="" type="checkbox"/> YES (If "yes", answer items 20 and 21 below) <input type="checkbox"/> NO (If "no", go to item 22) 20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES? IF YES, WHICH CLASSES? <input checked="" type="checkbox"/> FOUNDATION <input checked="" type="checkbox"/> REGISTERED <input checked="" type="checkbox"/> CERTIFIED 21. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? IF YES, SPECIFY THE NUMBER 1,2,3, etc. FOR EACH CLASS. <input type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input type="checkbox"/> CERTIFIED (If additional explanation is necessary, please use the space indicated on the reverse.)			
22. HAS THE VARIETY (INCLUDING ANY HARVESTED MATERIAL) OR A HYBRID PRODUCED FROM THIS VARIETY BEEN SOLD, DISPOSED OF, TRANSFERRED, OR USED IN THE U. S. OR OTHER COUNTRIES? <input checked="" type="checkbox"/> YES October 2003 <input type="checkbox"/> NO IF YES, YOU MUST PROVIDE THE DATE OF FIRST SALE, DISPOSITION, TRANSFER, OR USE FOR EACH COUNTRY AND THE CIRCUMSTANCES. (Please use space indicated on reverse.)		23. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT (PLANT BREEDER'S RIGHT OR PATENT)? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF YES, PLEASE GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. (Please use space indicated on the reverse.)			
24. The owners declare that a viable sample of basic seed of the variety has been furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate. The undersigned owner(s) is(are) the owner of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act. Owner(s) is(are) informed that false representation herein can jeopardize protection and result in penalties.					
SIGNATURE OF OWNER NAME (Please print or type) CAPACITY OR TITLE		SIGNATURE OF OWNER  NAME (Please print or type) Michael J. Martin CAPACITY OR TITLE Executive Vice President			
DATE		DATE 7-30-04			

GENERAL: To be effectively filed with the Plant Variety Protection Office (PVPO), **ALL** of the following items must be received in the PVPO: (1) Completed application form signed by the owner; (2) completed exhibits A, B, C, E; (3) for a seed reproduced variety at least 2,500 viable untreated seeds, for a hybrid variety at least 2,500 untreated seeds of each line necessary to reproduce the variety, or for tuber reproduced varieties verification that a viable (*in the sense that it will reproduce an entire plant*) tissue culture will be deposited and maintained in an approved public repository; (4) check drawn on a U.S. bank for \$2,705 (\$320 filing fee and \$2,385 examination fee), payable to "Treasurer of the United States" (See Section 97.6 of the Regulations and Rules of Practice.) Partial applications will be held in the PVPO for not more than 90 days, then returned to the applicant as unfilled. Mail application and other requirements to Plant Variety Protection Office, AMS, USDA, Room 401, NAL Building, 10301 Baltimore Avenue, Beltsville, MD 20705-2351. **Retain one copy for your files.** All items on the face of the application are self explanatory unless noted below. Corrections on the application form and exhibits must be initialed and dated. **DO NOT** use masking materials to make corrections. If a certificate is allowed, you will be requested to send a check payable to "Treasurer of the United States" in the amount of \$320 for issuance of the certificate. Certificates will be issued to owner, not licensee or agent.

Plant Variety Protection Office

Telephone: (301) 504-5518

FAX: (301) 504-5291

Homepage: <http://www.ams.usda.gov/science/pvpo/pvp.htm>

ITEM

- 18a. Give:
- (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method;
 - (2) the details of subsequent stages of selection and multiplication;
 - (3) evidence of uniformity and stability; and
 - (4) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified
- 18b. Give a summary of the variety's distinctness. Clearly state how this application variety may be distinguished from all other varieties in the same crop. If the new variety is most similar to one variety or a group of related varieties:
- (1) identify these varieties and state all differences objectively;
 - (2) attach statistical data for characters expressed numerically and demonstrate that these are clear differences; and
 - (3) submit, if helpful, seed and plant specimens or photographs (prints) of seed and plant comparisons which clearly indicate distinctness.
- 18c. Exhibit C forms are available from the PVPO Office for most crops; specify crop kind. Fill in Exhibit C (Objective Description of Variety) form as completely as possible to describe your variety.
- 18d. Optional additional characteristics and/or photographs. Describe any additional characteristics that cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, etc.
- 18e. Section 52(5) of the Act requires applicants to furnish a statement of the basis of the applicant's ownership. An Exhibit E form is available from the PVPO.
19. If "Yes" is specified (*seed of this variety be sold by variety name only, as a class of certified seed*), the applicant **MAY NOT** reverse this affirmative decision after the variety has been sold and so labeled, the decision published, or the certificate issued. However, if "No" has been specified, the applicant may change the choice. (See Regulations and Rules of Practice, Section 97.103).
22. See Sections 41, 42, and 43 of the Act and Section 97.5 of the regulations for eligibility requirements.
23. See Section 55 of the Act for instructions on claiming the benefit of an earlier filing date.

21. CONTINUED FROM FRONT (Please provide a statement as to the limitation and sequence of generations that may be certified.)

22. CONTINUED FROM FRONT (Please provide the date of first sale, disposition, transfer, or use for each country and the circumstances, if the variety (including any harvested material) or a hybrid produced from this variety has been sold, disposed of, transferred, or used in the U.S. or other countries.)

A limited amount of Certified seed of Renwood 3260 was sold in the U.S. A. for the first time in October 2003.

23. CONTINUED FROM FRONT (Please give the country, date of filing or issuance, and assigned reference number, if the variety or any component of the variety is protected by intellectual property right (Plant Breeder's Right or Patent).)

NOTES: It is the responsibility of the applicant/owner to keep the PVPO informed of any changes of address or change of ownership or assignment or owner's representative during the life of the application/certificate. There is no charge for filing a change of address. The fee for filing a change of ownership or assignment or any modification of owner's name is specified in Section 97.175 of the regulations. (See Section 101 of the Act, and Sections 97.130, 97.131, 97.175(h) of the Regulations and Rules of Practice.)

To avoid conflict with other variety names in use, the applicant must check the appropriate recognized authority. For example, for agricultural and vegetable crops, contact: Seed Branch, AMS, USDA, Room 213, Building 306, Beltsville Agricultural Research Center-East, Beltsville, MD 20705. Telephone: (301) 504-8089. <http://www.ams.usda.gov/lsg/seed.htm>

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 3.0 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, sexual orientation, marital or family status, political beliefs, parental status, or protected genetic information. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call 202-720-5964 (voice and

Renwood 3260 Wheat

18A. Exhibit A: Origin and Breeding History

Genealogy and Breeding Method. Renwood 3260 wheat variety, formerly designated VA96-54-326, was derived from the cross SC861562/'Coker 9803'. Parental line SC861562 has the parentage ASII/8*'Chancellor'/2/'Doublecrop'/3/'Coker 747'/4/Citr 17352. This parental line was obtained from the 1988-89 USDA-ARS International Winter Wheat Mildew Nursery and used primarily as a source of resistance to powdery mildew. The cross was made in spring 1990, and the F_1 generation was grown in the field as a single 4ft headrow in 1991 to produce F_2 seed. The population was advanced from the F_2 to F_4 generation using a modified bulk breeding method.

Population Advancement and Selection of the Variety. Wheat spikes were selected from the population in each segregating generation (F_2 - F_4) on the basis of absence of obvious disease, early maturity, short straw and desirable head shape and size. Selected spikes were threshed in bulk, and the seed was planted in 225ft² blocks in the fall of each year. Spikes selected from the F_4 bulk were threshed individually and planted in separate 4ft headrows at Warsaw, VA. The wheat line VA96-54-326, subsequently released as Renwood 3260, was derived as a bulk of one of these F_5 headrows selected in 1995. The line was tested as entry 326 in non-replicated observation yield tests in 1996 and was designated VA96-54-326. Renwood 3260 was evaluated in replicated yield tests in Virginia's Official Variety Trials from 1997 to 1999 (Tables 1-3), in regional trials conducted in NC, VA, MD, and KY in 1998-99 (Tables 4-5), and in the USDA Uniform Soft Red Winter Wheat Nursery in 1998-99 (Data publicly available but not presented here).

Multiplication and Purification. Initial Breeder seed of Renwood 3260 was developed during the 1998-99 season via removal of visually recognizable variant plants from a 9000 ft² F_9 seed increase block. Breeder seed harvested in bulk from this block was planted on 3 acres at the VCIA Foundation Seed Farm in Mt. Holly, VA during fall 2000, and produced approximately 200 bushels of Foundation seed. While Renwood 3260 remained stable and uniform in composition through these two generations of multiplication, the initial Breeder seed contained up to 0.5% taller plants, 0.5% plants with fully-awned spikes, 0.5% plants having purple colored straw at physiological maturity, and 0.5% later heading plants having strap (blocky) heads.

Development of a purer source of Renwood 3260 Breeder seed was initiated in fall 1999. In an isolation block, 280 F_{10} headrows, derived from individual spikes of Renwood 3260, were planted and evaluated several times during the growing season for purity, homogeneity, and trueness of type. Variant rows were removed and the remaining 213 selected rows were harvested in bulk to form a new source of Breeder seed, which was provided to the VCIA Foundation Seed Farm in fall 2000.

the following
Variants...

per phone
conversation
MAH 9/28/04

18B. Exhibit B: Novelty Statement

Renwood 3260 wheat is uniquely different from all known cultivars which it has been tested among, but is most similar to 'Sisson' (VA96W-250) wheat which shares 'Coker 9803' as a common parent. Sisson possesses the 1BL.1RS wheat/rye translocation and, therefore, has gene *Lr26* for leaf rust (*Puccinia triticina*) resistance and gene *Pm8* for powdery mildew resistance (*Blumeria graminis*), while Renwood 3260 lacks both the translocation and genes *Lr26* and *Pm8*. On the basis of tests conducted by the USDA-ARS Cereal Disease Lab, St. Paul, MN, seedlings of Sisson are resistant to leaf rust races that lack virulence for gene *Lr26* such as LBBQ (virulence for genes *Lr* 1, 10, 18), TDGL (*Lr* 1, 2a, 2c, 3, 10, 11, 24), and FLML (*Lr* 2c, 3, 3ka, 9, 10, 30), while seedlings of Renwood 3260 are susceptible to these races. In greenhouse tests conducted in 1996 and 1998 at Virginia Tech, seedlings of Sisson were susceptible (score of 3 on a 0=Resistant to 4=Susceptible) to composites of mildew isolates having virulence to gene *Pm8*, while seedlings of Renwood 3260 (score =0) were highly resistant. In seedling tests conducted by USDA-ARS Plant Science Research Unit at Raleigh, NC, Renwood 3260 expressed resistance to all isolates (11 tested) having virulence for gene *Pm8*.

Renwood 3260 and Sisson also differ on the basis of key plant descriptors (Exhibit C). Flag leaves of Renwood 3260 are recurved at booting, while those of Sisson are erect. Glumes of Renwood 3260 are medium in both length and width, while those of Sisson are long for both. Beaks of Renwood 3260 are acute, while those of Sisson are obtuse. Seed of Renwood 3260 has a medium brush and the phenol reaction is predominantly dark brown; whereas, seed of Sisson have a long brush and exhibit a fawn phenol reaction.

REPRODUCE LOCALLY. Include form number and date on all reproductions.

Form Approved - OMB No. 0581-0055

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 2.5 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

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To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call 202-720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

**U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MD 20705**

**OBJECTIVE DESCRIPTION OF VARIETY
WHEAT (*Triticum* spp.)**

NAME OF APPLICANT(S)	FOR OFFICIAL USE ONLY
Virginia Tech Intellectual Properties, Inc.	PVPO NUMBER
ADDRESS (Street and No. or RD No., City, State, and Zip Code)	200400286
1872 Pratt Drive, Suite 1625	VARIETY NAME
Blacksburg, VA 24060	Renwood 3260
	TEMPORARY OR EXPERIMENTAL DESIGNATION
	VA96-54-326

PLEASE READ ALL INSTRUCTIONS CAREFULLY: Place the appropriate number that describes the varietal character of this variety in the boxes below. Place a zero in the first box (e.g. or) when number is either 99 or less or 9 or less respectively. Data for quantitative plant characters should be based on a minimum of 100 plants. Comparative data should be determined from varieties entered in the same trial. Royal Horticultural Society or any recognized color standard may be used to determine plant colors; designate system used: _____

Please answer all questions for your variety; lack of response may delay progress of your application.

1. KIND:

- 1=Common
2=Durum
3=Club
4=Other (SPECIFY): _____

2. VERNALIZATION:

- 1=Spring
2=Winter
3=Other (SPECIFY): _____

3. COLEOPTILE ANTHOCYANIN:

- 1 = Absent 2 = Present

4. JUVENILE PLANT GROWTH:

- 1 = Prostrate 2 = Semi-erect 3 = Erect

5. PLANT COLOR (boot stage):

- 1 = Yellow-Green
2 = Green
3 = Blue-Green

6. FLAG LEAF (boot stage):

- 1 = Erect
2 = Recurved
- 1 = Not Twisted
2 = Twisted
- 1 = Wax Absent
2 = Wax Present

7. EAR EMERGENCE:

- Number of Days (Average)
- Number of Days Earlier Than Jackson *
- Same as _____ *
- Number of Days Later Than Pioneer 2691 *

* Relative to a PVPO-Approved Commercial Variety Grown in the Same Trial

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8. ANTER COLOR:

- ☐ 1 = Yellow
☐ 2 = Purple

9. PLANT HEIGHT (from soil to top of head, excluding awns):

☐ 9 ☐ 3

cm (Average)

☐ 0 ☐ 5

cm Taller Than Pioneer 2691 *

Same as *

☐ 0 ☐ 2

cm Shorter Than Jackson *

10. STEM:

A. ANTHOCYANIN

- ☐ 1 = Absent
☐ 2 = Present

B. WAXY BLOOM

- ☐ 2 = Absent
☐ 2 = Present

C. HAIRINESS

(last internode of rachis)

- ☐ 2 = Absent
☐ 2 = Present

D. INTERNODE

- ☐ 1 = Hollow 2 = Semi-solid 3 = Solid

☐ Number of Nodes

E. PEDUNCLE

- ☐ 3 = Erect 2 = Recurved 3 = Semi-erect

☐ 2 ☐ 0 cm Length

F. AURICLE

- ☐ 1 Anthocyanin 1 = Absent 2 = Present
☐ 2 Hair 1 = Absent 2 = Present

11. HEAD (at Maturity):

A. DENSITY

- ☐ 2 = Lax
☐ 2 = Middense (Laxidense)
☐ 3 = Dense

B. SHAPE

- ☐ 1 = Tapering
☐ 2 = Strap
☐ 3 = Clavate
☐ 4 = Other (SPECIFY): _____

C. CURVATURE

- ☐ 2 = Erect
☐ 2 = Inclined
☐ 3 = Recurved

D. AWNEDNESS

- ☐ 3 = Awnless
☐ 2 = Apically Awnletted
☐ 3 = Awnletted
☐ 4 = Awned

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12. GLUMES (at Maturity):

A. COLOR

- ☒ 1 = White
☐ 2 = Tan
☐ 3 = Other (SPECIFY): cream to yellow

B. SHOULDER

- ☒ 1 = Wanting 2 = Oblique
☐ 3 = Rounded 4 = Square
☐ 5 = Elevated 6 = Apiculate
☐ 7 = Other (SPECIFY): _____

C. SHOULDER WIDTH

- ☐ 1 = Narrow
☐ 2 = Medium
☐ 3 = Wide

D. BEAK

- ☒ 1 = Obtuse
☐ 2 = Acute
☐ 3 = Acuminate

E. BEAK WIDTH

- ☐ 1 = Narrow
☐ 2 = Medium
☐ 3 = Wide

F. GLUME LENGTH

- ☒ 1 = Short (ca. 7mm)
☐ 2 = Medium (ca. 8mm)
☐ 3 = Long (ca. 9mm)

G. WIDTH

- ☒ 1 = Narrow (ca. 3mm)
☐ 2 = Medium (ca. 3.5mm)
☐ 3 = Wide (ca. 4mm)

13. SEED

A. SHAPE

- ☒ 1 = Ovate
☐ 2 = Oval
☐ 3 = Elliptical

B. CHEEK

- ☒ 1 = Rounded
☐ 2 = Angular

C. BRUSH

- ☒ 1 = Short
☐ 2 = Medium
☐ 3 = Long

- ☒ 1 = Not Collared
☐ 2 = Collared

E. COLOR

- ☒ 1 = White
☐ 2 = Amber
☐ 3 = Red
☐ 4 = Other (SPECIFY): _____

F. TEXTURE

- ☒ 1 = Hard
☐ 2 = Soft
☐ 3 = Other (SPECIFY): _____

G. PHENOL REACTION (see instructions):

- ☒ 1 = Ivory 4 = Dark Brown
☐ 2 = Fawn 5 = Black
☐ 3 = Light Brown
33% Ivory, 67% Dark Brown

H. SEED WEIGHT

- ☒ 3 ☒ 2 g/1000 seed (Whole number only)

I. GERM SIZE

- ☒ 1 = Small
☐ 2 = Midsize
☐ 3 = Large

D. CREASE

- ☒ 1 = Width 60% or less of Kernel
☐ 2 = Width 80% or less of Kernel
☐ 3 = Width Nearly as Wide as Kernel

- ☒ 1 = Depth 20% or less of Kernel
☐ 2 = Depth 35% or less of Kernel
☐ 3 = Depth 50% or less of Kernel

14. Disease : (0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)

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PLEASE INDICATE THE SPECIFIC RACE OR STRAIN TESTED

<input checked="" type="checkbox"/> 2 Stem Rust (<i>Puccinia graminis</i> f. sp. <i>tritici</i>) QKCS, RTHJ, TPMK	<input checked="" type="checkbox"/> 1 Leaf Rust (<i>Puccinia recondita</i> f. sp. <i>tritici</i>) FLML, LBBQ, MCDL, MCRQ, TNRJ
<input type="checkbox"/> 0 Stripe Rust (<i>Puccinia striiformis</i>)	<input type="checkbox"/> 0 Loose Smut (<i>Ustilago tritici</i>)
<input checked="" type="checkbox"/> 3 Tan Spot (<i>Pyrenophora tritici-repentis</i>)	<input type="checkbox"/> 0 Flag Smut (<i>Urocystis agropyri</i>)
<input type="checkbox"/> 0 Halo Spot (<i>Selenophoma donacis</i>)	<input type="checkbox"/> 0 Common Bunt (<i>Tilletia tritici</i> or <i>T. laevis</i>)
<input checked="" type="checkbox"/> 3 <i>Septoria nodorum</i> (Glume Blotch)	<input type="checkbox"/> 0 Dwarf Bunt (<i>Tilletia controversa</i>)
<input type="checkbox"/> 0 <i>Septoria avenae</i> (Speckled Leaf Disease)	<input type="checkbox"/> 0 Karnal Bunt (<i>Tilletia indica</i>)
<input checked="" type="checkbox"/> 1 <i>Septoria tritici</i> (Speckled Leaf Blotch)	<input checked="" type="checkbox"/> 2 Powdery Mildew (<i>Erysiphe graminis</i> f. sp. <i>tritici</i>)
<input checked="" type="checkbox"/> 4 Scab (<i>Fusarium</i> spp.)	<input type="checkbox"/> 0 "Snow Molds"
<input type="checkbox"/> 0 "Black Point" (Kernel Smudge)	<input type="checkbox"/> 0 Common Root Rot (<i>Fusarium</i> , <i>Cochliobolus</i> and <i>Bipolaris</i> spp.)
<input checked="" type="checkbox"/> 3 Barley Yellow Dwarf Virus (BYDV)	<input checked="" type="checkbox"/> 3 Rhizoctonia Root Rot (<i>Rhizoctonia solani</i>)
<input checked="" type="checkbox"/> 3 Soilborne Mosaic Virus (SBMV)	<input checked="" type="checkbox"/> 3 Black Chaff (<i>Xanthomonas campestris</i> pv. <i>translucens</i>)
<input checked="" type="checkbox"/> 3 Wheat Yellow (Spindle Streak) Mosaic Virus	<input type="checkbox"/> 0 Bacterial Leaf Blight (<i>Pseudomonas syringae</i> pv. <i>syringae</i>)
<input type="checkbox"/> 0 Wheat Streak Mosaic Virus (WSMV)	<input type="checkbox"/> Other (SPECIFY) _____
<input type="checkbox"/> Other (SPECIFY) _____	<input type="checkbox"/> Other (SPECIFY) _____
<input type="checkbox"/> Other (SPECIFY) _____	<input type="checkbox"/> Other (SPECIFY) _____
<input type="checkbox"/> Other (SPECIFY) _____	<input type="checkbox"/> Other (SPECIFY) _____

15. INSECT: (0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)

PLEASE SPECIFY BIOTYPE (where needed)

<input checked="" type="checkbox"/> 1 Hessian Fly (<i>Mayetiola destructor</i>) Biotypes GP, B, C, D, E, L	<input type="checkbox"/> Other (SPECIFY) _____
<input type="checkbox"/> 0 Stem Sawfly (<i>Cephus</i> spp.)	<input type="checkbox"/> Other (SPECIFY) _____
<input checked="" type="checkbox"/> 1 Cereal Leaf Beetle (<i>Oulema melanopa</i>)	<input type="checkbox"/> Other (SPECIFY) _____
<input type="checkbox"/> 0 Russian Aphid (<i>Diuraphis noxia</i>)	<input type="checkbox"/> Other (SPECIFY) _____

15. INSECT: *Continued* (0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)

PLEASE SPECIFY BIOTYPE (where needed)

200400286

☐

Greenbug (*Schizaphis graminum*)

☐

Other (SPECIFY) _____

☐

Aphids

☐

Other (SPECIFY) _____

16. ADDITIONAL INFORMATION ON ANY ITEM ABOVE, OR GENERAL COMMENTS

Renwood 3260 Wheat

18D. Exhibit D: Additional Description of the Variety

Renwood 3260 is an early heading, medium height, awnleted, soft red winter wheat with a high test weight and moderately strong gluten strength. Head emergence and plant height (37 inches) of Renwood 3260 are similar to those of 'Pioneer 2580' (Tables 1-3). Straw strength of Renwood 3260 is moderately good and better than that of 'Jackson'. In the 1998-1999 Uniform Southern Soft Red Winter Wheat Nursery (99USSRWWN), Renwood 3260 had a mean lodging score (0 = none to 9 = severe) of 1.6 compared to 4.1 for 'Coker 9835', averaged over six locations where lodging was significant. Grain yield of Renwood 3260 is similar to that of Pioneer 2580, and test weight is similar to or higher than that of Jackson. Based on very limited data (99USSRWWN), winter-hardiness of Renwood 3260 likely is moderate and most similar to that of Coker 9835 with both varieties having average survival scores (65-66%). Milling and pastry baking quality (Tables 6 and 7) of Renwood 3260 is most similar to that of Jackson. However, protein of Renwood 3260 is unique in that it has strong gluten strength, which is desirable for production of crackers and certain bread products. While protein concentration of Sisson (VA96W-250) in Figure 1 (10.36%) and Renwood 3260 (10.73%) in Figure 2 do not differ greatly, Renwood 3260 has much stronger gluten strength on the basis of mixograph number (143) than Sisson (80.8).

Renwood 3260 is resistant to powdery mildew (Tables 1-4). In seedling tests of entries evaluated in the 1998-99USSRWWN, this line was resistant to 13 of 14 isolates of *Blumeria graminis*. Reaction of Renwood 3260 to leaf rust (*Puccinia triticina*) has varied from moderately resistant to susceptible depending on the races prevalent (Tables 1-4). On the basis of seedling tests conducted at the USDA-ARS Cereal Disease Lab in St. Paul, MN, Renwood 3260 has genes *Sr6* and *Sr36* for stem rust (*Puccinia graminis*) resistance and expressed resistance to races QKCS, RTHJ and TPMK. Renwood 3260 is moderately resistant to *barley yellow dwarf virus* and glume blotch (*Septoria nodorum*). In seedling tests conducted at Purdue University by USDA-ARS, Renwood 3260 was susceptible to Hessian fly [*Mayetiola destructor* (Say)] biotypes GP, B, C, D, E and L.

Table 1. Summary of performance of VA96-54-326 in the Virginia Tech Wheat Test, 1999 harvest.*

Brand/Variety	Yield (Bu/A)	Test Weight (Lb)	Date Headed (Mar 31+)	Height (In)	Lodg- ing** (0.2-10)	Powdery Leaf		Barley Yellow	
						Mildew	Rust	Septoria	Dwarf
	(6)	(6)	(3)	(3)	(2)	(2)	(3)	(2)	(2)
PIONEER 2580	77	57.6	33	37	0.7	2	4	3	2
JACKSON	83	59.3	37	40	2.9	3	4	2	2
COKER 9835	78	57.5	35	35	3.0	2	7	2	2
FFR 555W	69	57.7	40	37	0.6	5	5	2	4
VA96-54-326	77	59.3	34	38	1.4	1	3	2	1
VA96W-247	80	58.2	38	35	1.8	1	1	3	3
VA96W-250	84	58.4	36	36	2.6	2	2	2	2
VA96W-158	84	58.3	32	38	1.9	1	4	4	3
VA96W-270	68	57.6	35	38	0.5	1	3	2	1
Average	75	58.1	36	38	1.3	2	3	3	2
LSD (0.05)	4	0.4	1	1	1.0	1	1	1	1

* The number in parentheses below column headings indicates the number of locations on which data are based. A plus or minus sign indicates a performance significantly above or below the test average, respectively.

** Belgian Lodging Scale = Area x Intensity x 0.2. Area = 1-10, where 1 is wheat unaffected and 10 is entire plot affected and Intensity = 1-5, where 1 is wheat standing upright and 5 is wheat lying totally flat.

* The 0-9 ratings indicate relative disease intensity where 0=none and 9=total plant infection.

Table 2. Summary of performance of VA96-54-326 in the Virginia Tech Wheat Test, 1998 harvest.*

Brand/Variety	Yield (Bu/A)	Test Weight (Lb)	Date Headed (Mar 31+)	Height (In)	Lodg- ing** (0.2-10)	Powdery Mildew ———	Leaf Rust (0-9)*	Septoria ———
	(7)	(7)	(4)	(3)	(6)	(1)	(1)	(1)
PIONEER 2580	76	54.7	25	38	1.1	1	6	5
JACKSON	73	56.1	28	38	4.7	4	6	4
FFR 555-B	73	54.7	29	39	0.8	7	8	5
COKER 9835	69	53.6	28	35	1.8	4	6	5
VA96-54-326	74	56.6	25	37	3.3	1	8	5
VA96W-247	80	55.6	27	37	2.8	2	4	3
VA96W-250	80	55.8	26	34	3.6	1	4	4
Average	75	55.3	27	37	2.6	3	6	4
LSD (0.05)	3	0.6	1	1	0.8	1	2	1

* The number in parentheses below column headings indicates the number of locations on which data are based. A plus or minus sign indicates a performance significantly above or below the test average, respectively.

** Belgian Lodging Scale = Area x Intensity x 0.2. Area = 1-10, where 1 is wheat unaffected and 10 is entire plot affected and Intensity = 1-5, where 1 is wheat standing upright and 5 is wheat lying totally flat.

♦ The 0-9 ratings indicate relative disease intensity where 0=none and 9=total plant infection.

Table 3. Summary of performance of VA96-54-326 in the Virginia Tech Wheat Test, 1997 harvest.*

Brand/Variety	Yield (Bu/A)	Test Weight (Lb)	Date Headed (Mar 31+)	Height (In)	Powdery Mildew	Leaf Rust (0-9) [♦]	Barley Yellow	
							Septoria	Dwarf
	(6)	(6)	(4)	(3)	(3)	(3)	(1)	(2)
PIONEER 2580	81	59.9	32	36	1	3	1	3
JACKSON	80	61.0	34	38	1	4	1	2
COKER 9835	77	59.4	35	33	2	2	1	3
FFR 555W	76	59.6	35	37	4	5	2	2
VA96-54-326	79	61.4	31	37	0	3	1	1
Average	78	60.3	33	36	2	3	1	2
LSD (0.05)	4	0.3	1	1	1	2	1	1

* The number in parentheses below column headings indicates the number of locations on which data are based. A plus or minus sign indicates a performance significantly above or below the test average, respectively.

♦ The 0-9 ratings indicate relative disease intensity where 0=none and 9=total plant infection.

Table 4. Summary of performance of VA96-54-326 in the 1998-99 Uniform Mason-Dixon Wheat Test.

Line	Yield (Bu/A) (2) ¹	Test Weight (lbs./Bu) (2)	Date Headed (Mar 31+) (2)	Height (in.) (2)	Lodging (0.2-10) ² (2)	Powdery		Winter Kill (0-9) (1)	BYDV ⁴ (0-9) (2)	Leaf	
						Mildew (0-9) ³ (2)				Rust (0-9) (1)	Septoria (0-9) (1)
Pioneer 2580	87	59.2	33	36	0.2	0		3	2	2	2
Coker 9663	82	60.8	33	40	5.0	1		3	1	0	2
Agripro Foster	78	59.8	37	37	0.2	2		2	3	3	3
Roane	89	62.3	38	35	3.0	0		0	2	1	1
VA96-54-326	89	61.0	32	38	5.0	0		6	1	2	2
VA96W-247	102	60.3	35	35	0.2	0		0	2	2	2
VA96W-158	94	59.8	30	37	0.2	0		4	2	3	2
VA96W-270	79	59.7	33	37	0.2	0		0	3	2	3
LSD (0.05) ⁵	7	0.7	1	1	0.6	0.7		1	1	1	1
Test Average ⁶	80	60.1	34	36	0.5	1		2	2	1	2

¹ The number in parentheses indicates the number of locations upon which data are based. This table reflects results only from the Blacksburg, VA, and Warsaw, VA, research sites. The test was also conducted in Maryland, Kentucky, and North Carolina.

² Belgian lodging scale = area x intensity x 0.2. Area is rated on a scale from 1 (plot unaffected) to 10 (entire plot affected). Intensity is rated on a scale from 5 (plants standing upright) to 5 (plants lying totally flat).

³ All 0-9 ratings indicate relative disease severity: 0 = no disease present; 9 = total infestation of the plant by the disease.

⁴ Barley yellow dwarf virus.

⁵ Overall LSD values for all 84 entries in the test.

⁶ Test average for Virginia locations only.

Table 5. Grain Yields of VA96-54-326 tested at seven locations in four states in the 1998-99 Uniform Mason-Dixon Wheat Test.

Line	Lexington, KY	Logan County, KY	Wye, MD	Beltsville, MD	Yield (Bu/A)				Warsaw, VA	Blacksburg, VA	Overall (7 locations)
					Plymouth, NC	VA	VA	VA			
Pioneer 2580	51	95	74	79	50	99	75	76			
Coker 9663	50	97	68	72	62	97	66	72			
Foster	45	102	67	70	43	91	65	69			
Roane	59	77	73	73	50	103	75	72			
VA96-54-326	49	92	80	74	58	95	82	76			
VA96W-247	44	99	79	80	46	117	86	79			
VA96W-158	51	102	87	73	51	103	85	79			
VA96W-270	46	90	68	70	47	86	72	68			
LSD (0.05) ¹	10	16	8	10	8	7	11	4			
Test Avg.	48	86	68	69	49	90	70	69			

¹ Overall LSD values for all 84 entries in the test.

Table 6. Milling and baking quality of VA96-54-326 wheat: 1998 crop

Entry	Milling quality score	Baking quality score	Adj. flour yield %	Protein %	AWRC %	Softness equiv.
Massey (standard)	100.0	A	73.6	10.1	54.4	55.0
FFR555W-B	101.8	A	74.2	9.1	53.7	54.7
Pioneer 2580-B	94.6	C	72.0**	8.6	55.3	55.2
Jackson	95.8	B	72.3*	9.7	56.7	56.0
Coker 9835-D	96.2	B	72.5*	8.7	57.3*	60.4
Coker 9663	97.1	B	72.7	9.6	57.2	48.7
VA96-54-326	99.8	B	73.6	10.0	55.5	54.1
VA96W-247	94.9	B	72.1*	8.4	57.4*	54.5
VA96W-250	96.9	B	72.7*	9.3	57.0*	51.8*

*Score is one standard deviation away from the standard cultivar's score.

**Score is two standard deviations away from the standard cultivar's score.

Table 7. Milling and baking quality of VA96-54-326 wheat: 1997 crop

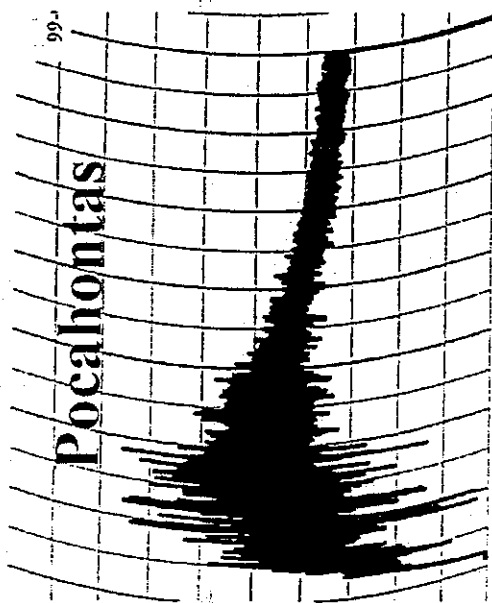
Entry	Milling quality score	Baking quality score	Adj. flour yield %	Protein %	AWRC %	Softness equiv.
Madison (standard)	100.0	A	71.8	8.8	56.8	48.5
Massey	98.3	B	71.2	9.3	57.7	51.3
FFR555W	103.7	A	72.8	9.4	56.4	50.6
Pion. 2580	94.2	C	70.0**	9.1	60.4*	45.9*
Jackson	96.8	B	70.8*	9.1	58.2	52.0
Coker 9835	96.6	B	70.8*	8.0	59.5*	58.8
Coker 9663	96.6	B	70.7*	9.8*	59.0	44.6*
VA96-54-326	102.8	A	72.6	9.7*	58.6	48.0

*Score is one standard deviation away from the standard cultivar's score.

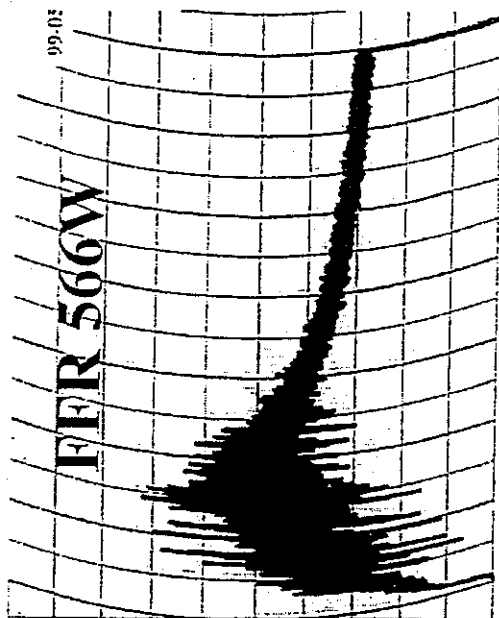
**Score is two standard deviations away from the standard cultivar's score.

FIGURE 1. MIXOGRAPH CURVES OF SOME WEAK GLUTEN WHEAT LINES: MIXO NO. LESS THAN 100 INDICATES WEAK GLUTEN

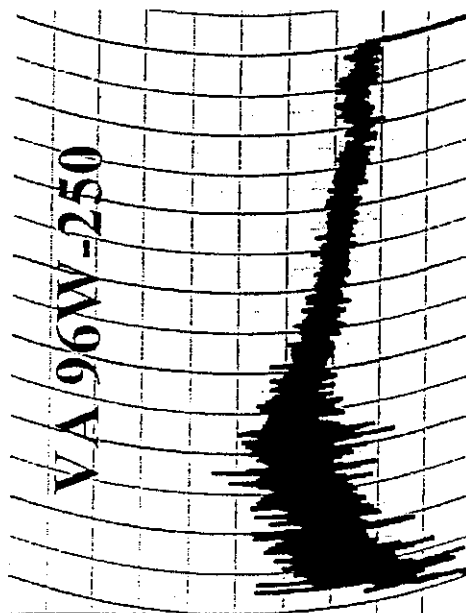
Weak Gluten



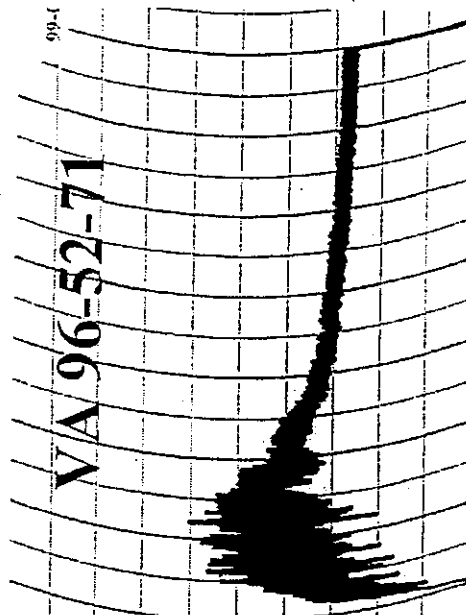
Protein: 10.38
Mixo No.: 88.2



Protein: 10.61
Mixo No.: 83.2



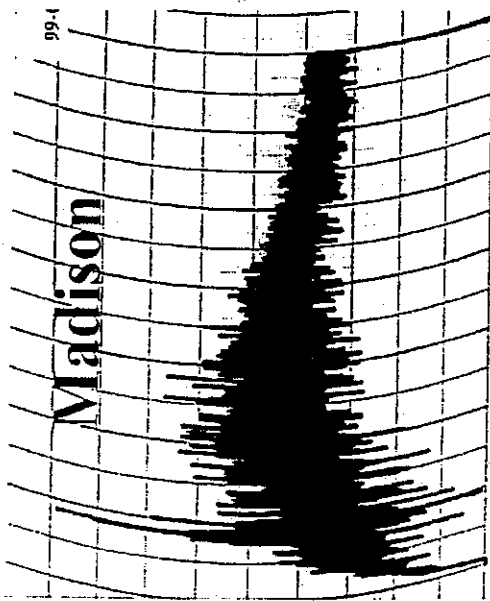
Protein: 10.36
Mixo No.: 80.8



Protein: 9.94
Mixo No.: 56.9

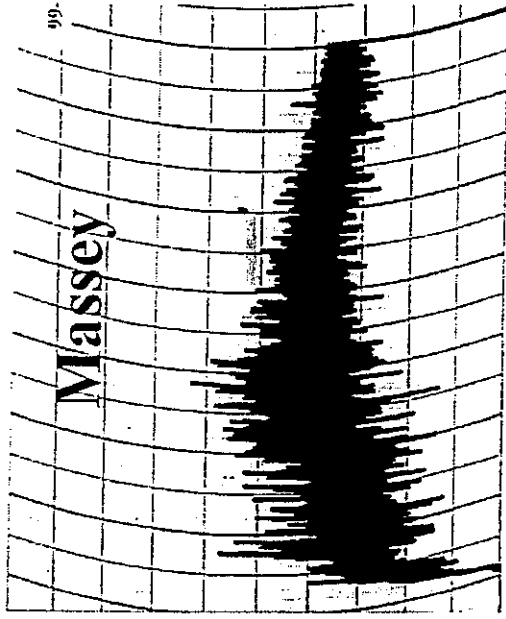
FIGURE 2. MIXOGRAPH CURVES OF SOME MEDIUM-STRENGTH GLUTEN WHEAT LINES:
MIXO NO. GREATER THAN 100 INDICATES STRONGER GLUTEN STRENGTH

Medium Gluten



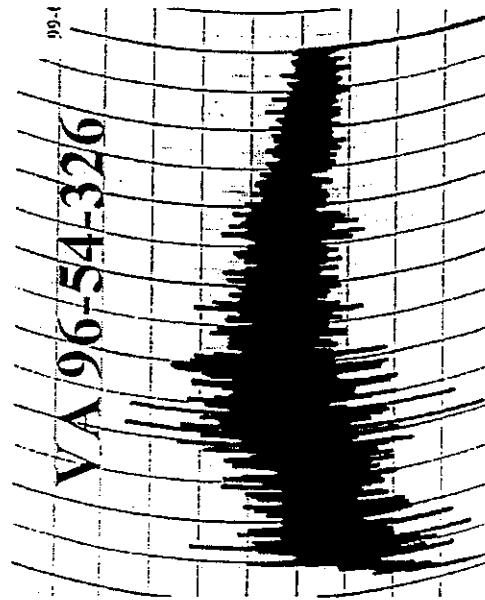
Protein: 9.08

Mixo No.: 98.2



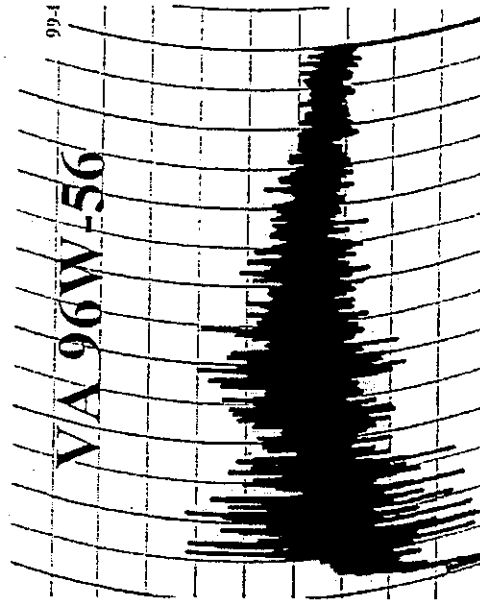
Protein: 9.58

Mixo No.: 126



Protein: 10.73

Mixo No.: 143



Protein: 8.47

Mixo No.: 102

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). The information is held confidential until the certificate is issued (7 U.S.C. 2426).

EXHIBIT E
STATEMENT OF THE BASIS OF OWNERSHIP

1. NAME OF APPLICANT(S) Virginia Tech Intellectual Properties, Inc.	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER VA96-54-326	3. VARIETY NAME Renwood 3260
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP, and Country) 1872 Pratt Drive Suite 1625 Blacksburg, VA 24060	5. TELEPHONE (Include area code) 540-951-9374	6. FAX (Include area code) 540-951-5292
7. PVPO NUMBER 200400286		

8. Does the applicant own all rights to the variety? Mark an "X" in the appropriate block. If no, please explain. ☒ YES ☐ NO9. Is the applicant (individual or company) a U.S. national or a U.S. based company? If no, give name of country. ☒ YES ☐ NO10. Is the applicant the original owner? ☐ YES ☒ NO If no, please answer one of the following:

a. If the original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. National(s)?

☐ YES ☐ NO If no, give name of country

b. If the original rights to variety were owned by a company(ies), is (are) the original owner(s) a U.S. based company?

☒ YES ☐ NO If no, give name of country

11. Additional explanation on ownership (if needed, use the reverse for extra space):

PLEASE NOTE:

Plant variety protection can only be afforded to the owners (not licensees) who meet the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.
2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.
3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed the final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definitions.

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